



FEELER ® FAIR FRIEND GROUP
FAIR FRIEND ENTERPRISE CO., LTD.

SHB *SERIES*

CNC Horizontal Boring &
Milling Machine

FAIR FRIEND • ENGINEERING • EXCELLENCE • LEADERSHIP • EXPERTISE • RELIABILITY



HEADQUARTERS
No. 186, Yong Chi Road, Taipei, Taiwan.
Tel: +886-2-2763-9696
Fax: +886-2-2768-0636/37/39
www.ffg-tw.com
E-mail: chairon@fairfriend.com.tw

FEELER[®] FAIR FRIEND GROUP
FAIR FRIEND ENTERPRISE CO., LTD.

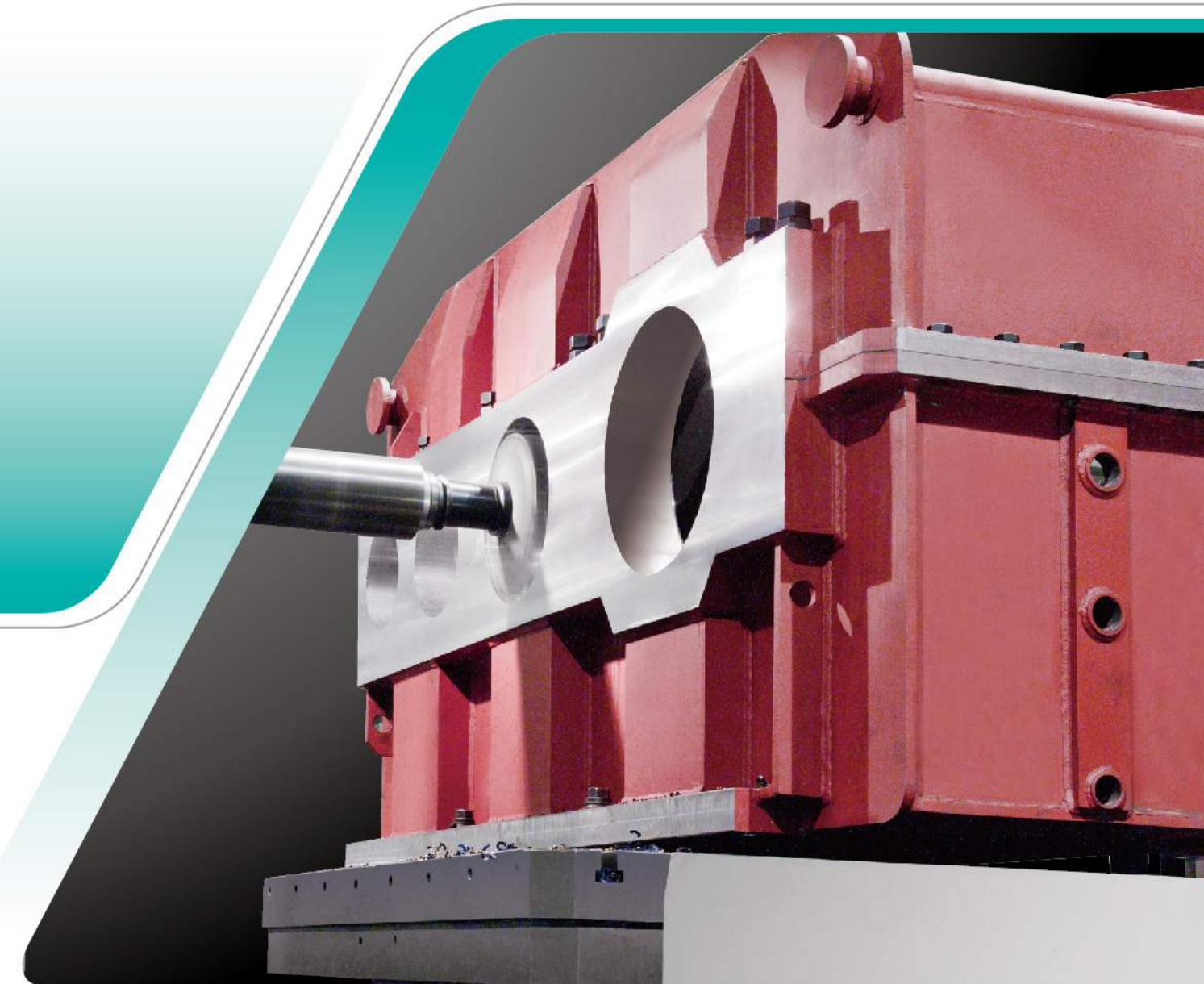
FEELER MACHINE TOOLS DIVISION
No. 12, Jingke Rd., Nantun Dist., Taichung City, Taiwan
Tel: +886-4-2359-4075
Fax: +886-4-2359-4873
www.feeler.com
E-mail: sales@feeler.com



Website



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SHB *SERIES*

CNC Horizontal Boring &
Milling Machine

Boring and Milling Machine A Tradition of Excellence

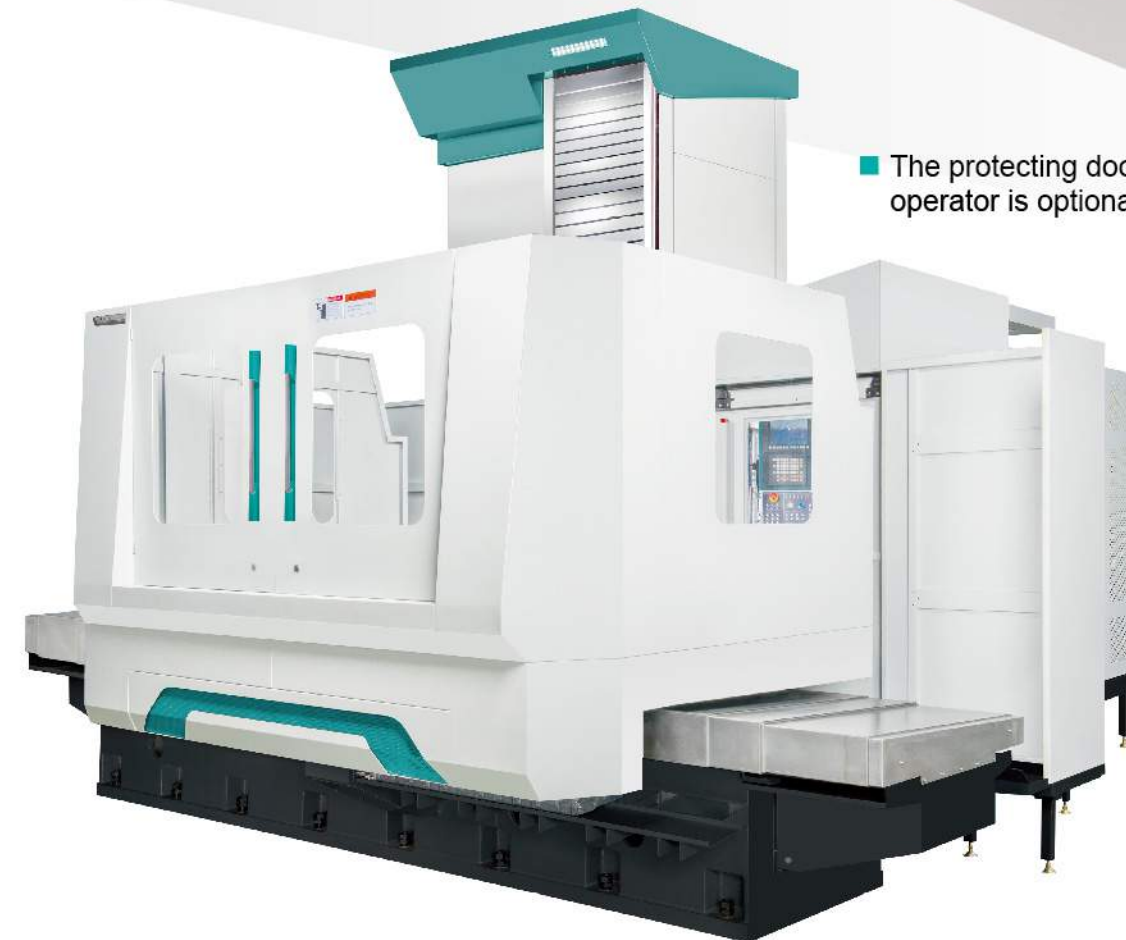
Full range of boring machine could meet customer demands,
each machine has customer expected features!



■ The protecting door for operator is optional.

SHM-11020RF

- Column fixed
- Rotary table 0.001°
- Table size 1200 x 1000 mm
- W-axis travel 400 mm
- Three axis box way



■ The protecting door for operator is optional.

SHB-130XXRS/RM/RL

- W=130mm
- Column Moving
- Rotary table 0.001°
- Table size
 - RS: 1600 x 1400 mm
 - RM: 2000 x 1800 mm
 - RL: 3200 x 1800 mm
- W-axis travel 700mm (Opt. 900) mm

SHB-110XXRS/RM

- W=110mm
- Column Moving
- Rotary table 0.001°
- Table size
 - RS : 1600x1400mm
 - RM : 2000x1800mm
- W-axis travel
 - RS: 500mm (Opt.: 700mm)

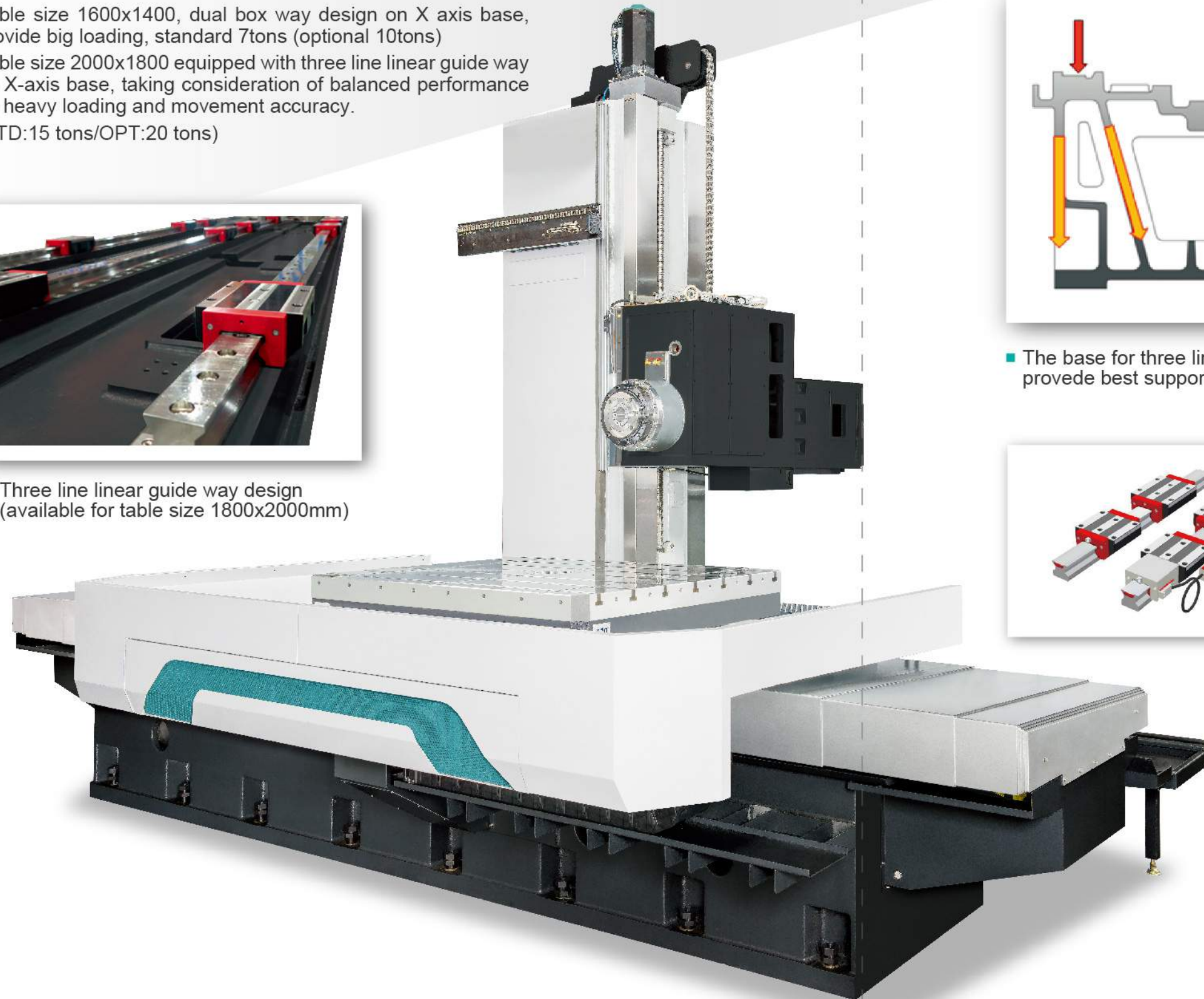
Stable Base Structure

Provide Steady Support of Heavy Loading

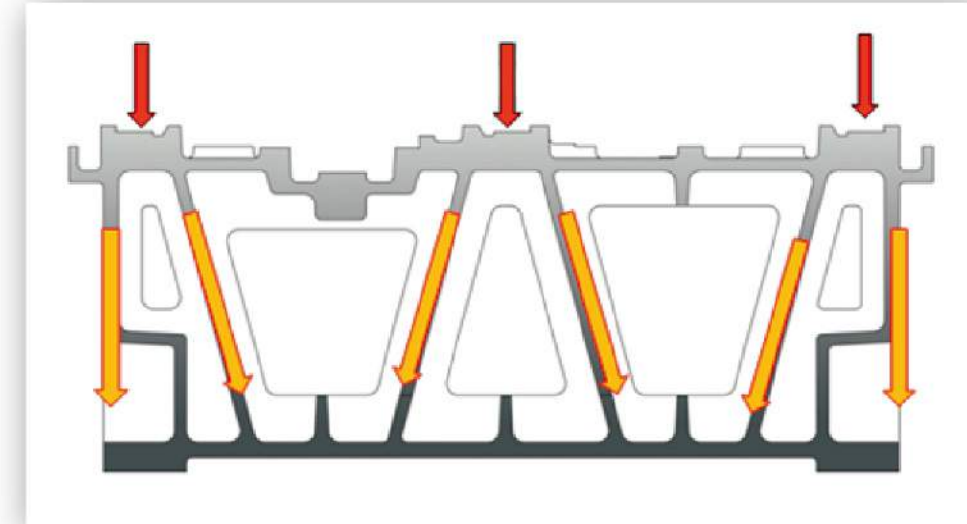
- Full structure with casting iron to meet all kinds of using demands
- Table size 1600x1400, dual box way design on X axis base, provide big loading, standard 7tons (optional 10tons)
- Table size 2000x1800 equipped with three line linear guide way on X-axis base, taking consideration of balanced performance on heavy loading and movement accuracy. (STD:15 tons/OPT:20 tons)



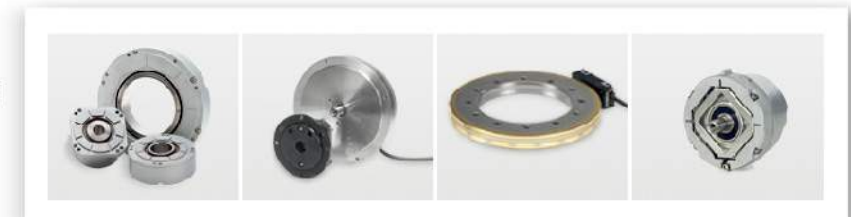
- Three line linear guide way design (available for table size 1800x2000mm)



- Modularize design to meet various demands
- With years of experience, Sanco R&D team improved detail design (include chip conveyor unit, drain(coolant), installation and commission, transportation and rigidity)



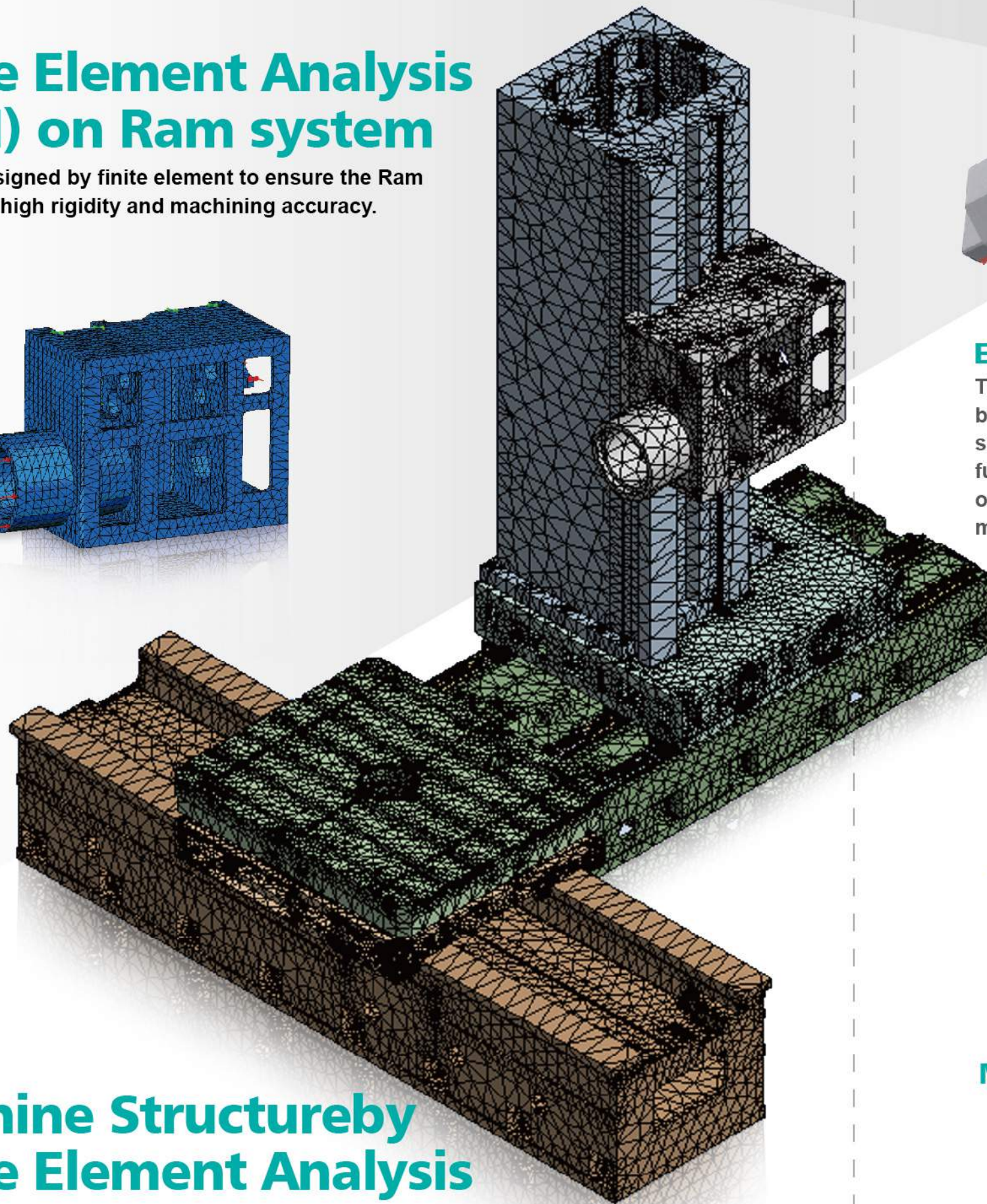
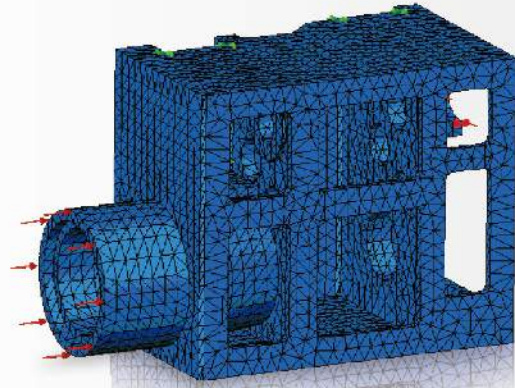
- The base for three line linear guide way use "3A" design, provide best support and strength. (table size:2000mmx1800mm)



- X/Y/Z axis and rotary table equip with optical linear scale feedback system to ensure the accuracy. (Std.)

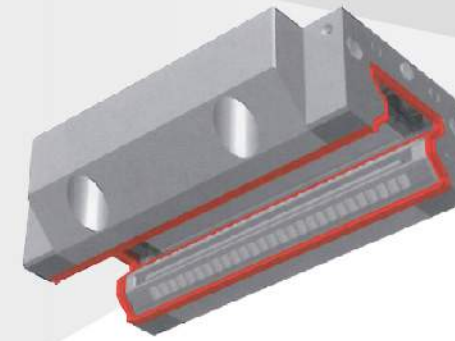
Finite Element Analysis (FEM) on Ram system

The Ram designed by finite element to ensure the Ram system with high rigidity and machining accuracy.



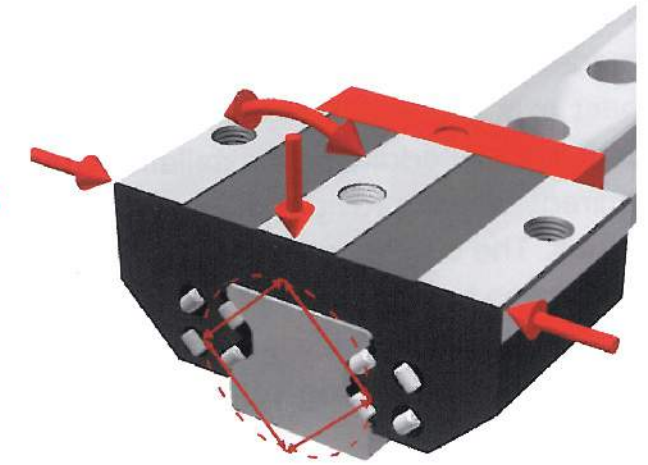
Machine Structure by Finite Element Analysis

Horizontal Boring & Milling Machine, the main structural design all through Finite Element Analysis (FEM), ensure each machine with excellent rigidity, stability and good accuracy for long time.



Excellent Dust-proof Effects

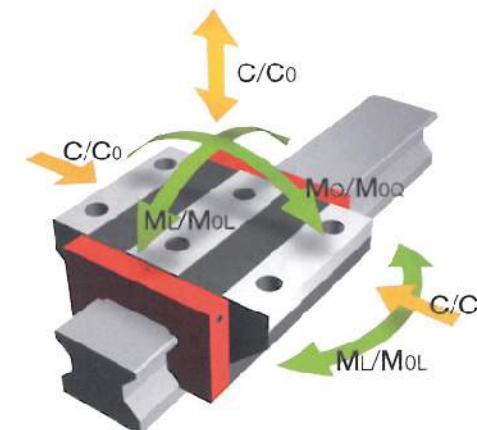
The gap between front panel and body is protected by protective sheet, which provide a sealing function and prevent dust. Reduce oil consumption and extend the machine life.



Features of the heavy linear guide way -Schneeberger (Swiss brand)

Linear guide way use unique "O" type configuration

- Advanced "o" type configuration structure make the loading surface have better internal spacing. 90 ° offsets on roller guide way could absorb the force from all direction, and best support capacity to increase the movement rigidity.
- More blocks to be used to increase the loading capacity . Far superior to similar products.
- The dimension of each block(LxW): 251x126mm (each line with 4 blocks on Z axis)



MR65 Rated Load Chart

Spindle System with High Dynamic Performance (SHB-SERIES)

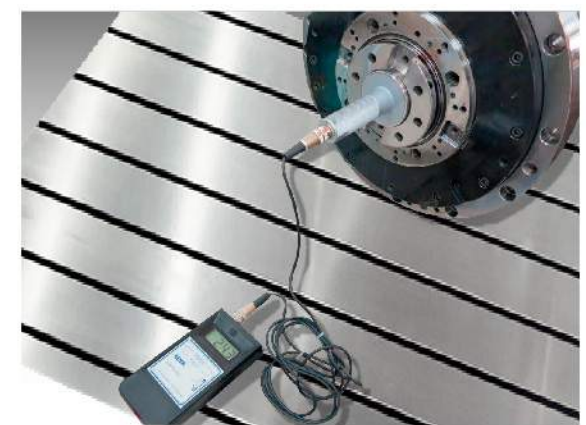
FEELER horizontal boring machine can make machine to be universal, to complete the complex boring and milling job.



■ The hardness test of W axis

Available for high dynamic spindle

Following years of professional experiences and skills on producing boring & milling machine, Feeler developed high movement speed, high-precision, long-life spindle system. Both Spindle and W-axis through Nitriding treatment, grinding and polishing to mirror grade, W axis heat distortion is hence minimized during running, particularly suitable for high speed and high dynamic applications.



■ Pull force of W axis



■ W axis surface roughness test

Spindle (W-axis) Material Processing capacity with extreme precision rendering



W axis and bearing system lubricated and cooled by Oil & Air system



- New high dynamic spindle system equipped with oil & air lubrication system to reach high accuracy and long life.
- Lubrication system transmit lowest quantity of new oil to each bearing, thus inhibit bearing temperature rise and ensure long life of the spindle.

High Positioning Accuracy on Rotary Table

The rotary table is driven by double lead worm /worm wheel (simultaneous, opt.) to minimize backlash. Therefore high positioning accuracy is performed.



Direct Drive Rotary Table (moving column)

- Table size: 1600x1400mm, 2000x1800mm
- Dynamic oil pressure design makes smooth running even when max. loading.
- Auto-lock pin with Hydraulic system for heavy cutting at every 90 degree
- Table indexing 0.001°
- Table rotating at every 90 ° with locking pin to ensure angular accuracy.

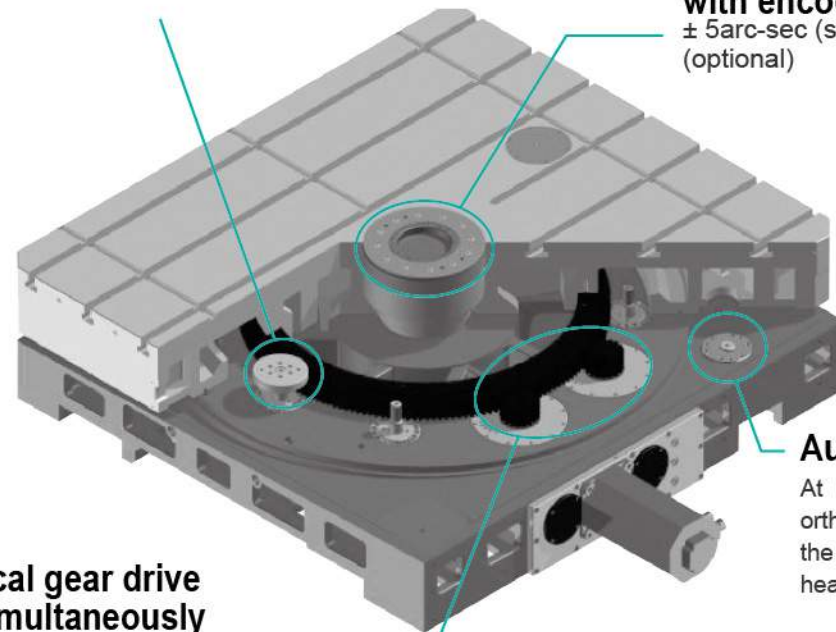


The Feature of Rotary Table

The feature of brake system

- Multi-ring uniform arrangement , homogeneous force when braking
- Clamp and unclamp by hydraulic system and use pressurized cylinder to increase the locking force.
- Locking the table directly on the chassis with hydraulic brakes to obtain good stability
- Braking force in the axial direction has no center offset.

Enhance the precision with encoderr
± 5arc-sec (standard), ±2.5arc-sec (optional)



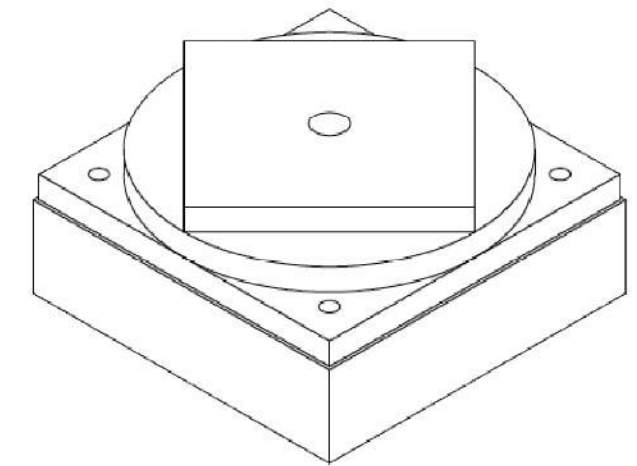
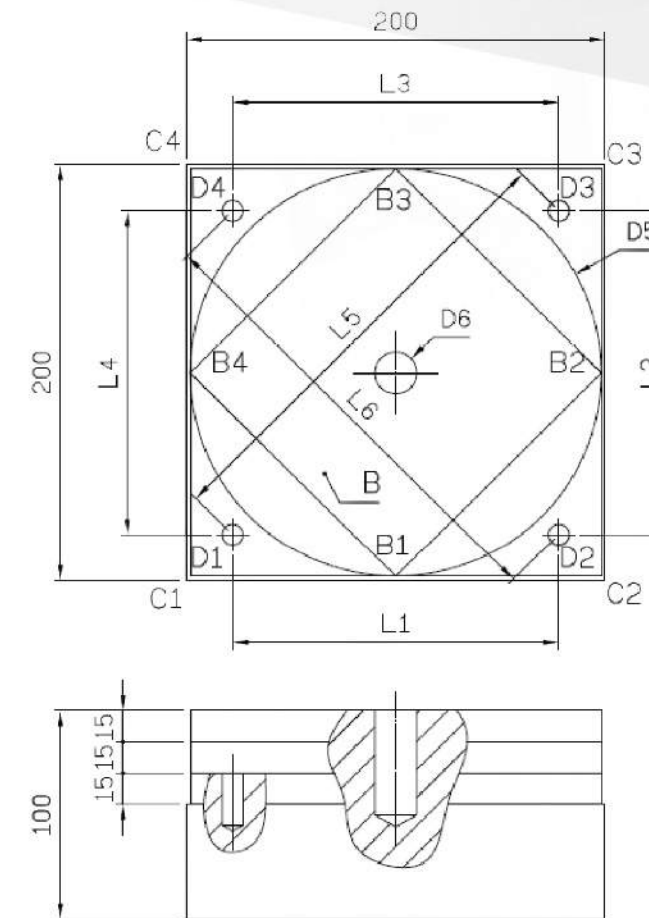
Auto Lock Pin system

At 0 °, 90 °, 180 °, 270 ° four orthogonal directions, the design of the positioning pin can withstand heavy cutting needs.

Double helical gear drive - without simultaneously

Dual-gear drive eliminates backlash, keeping good accuracy. Helical gears can provide good engagement, smooth transmission and high loading capacity of the gear.

Heavy Cutting Report

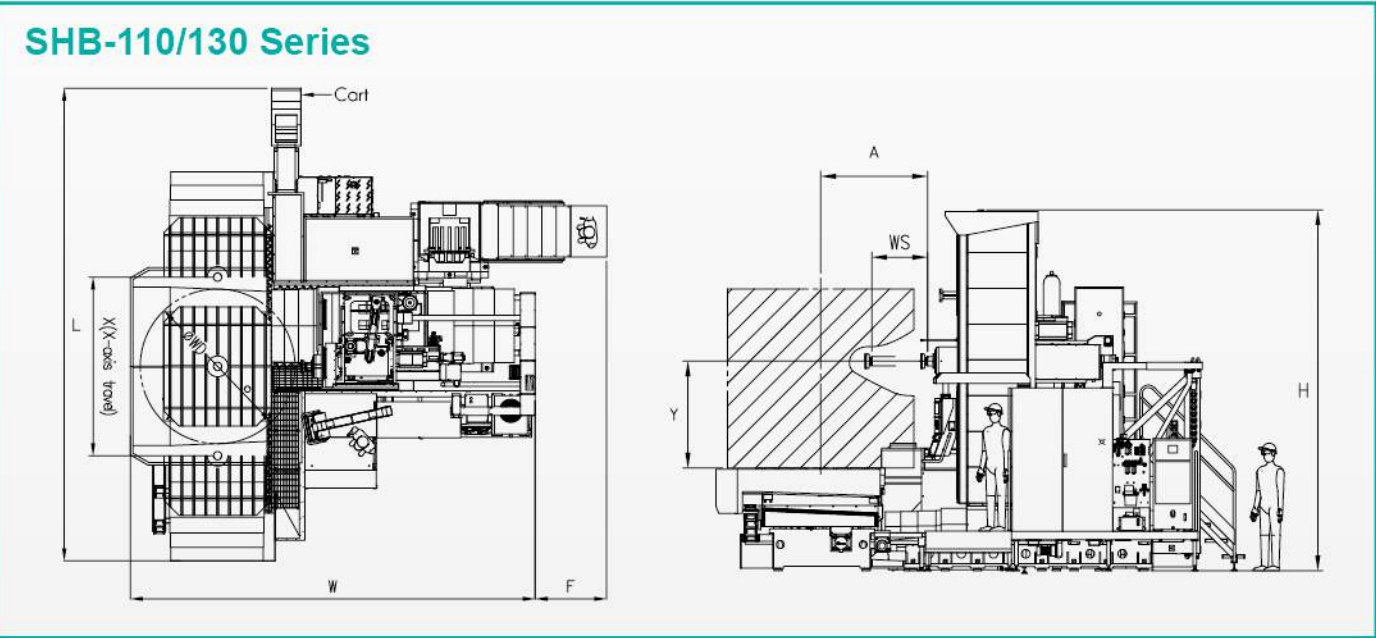
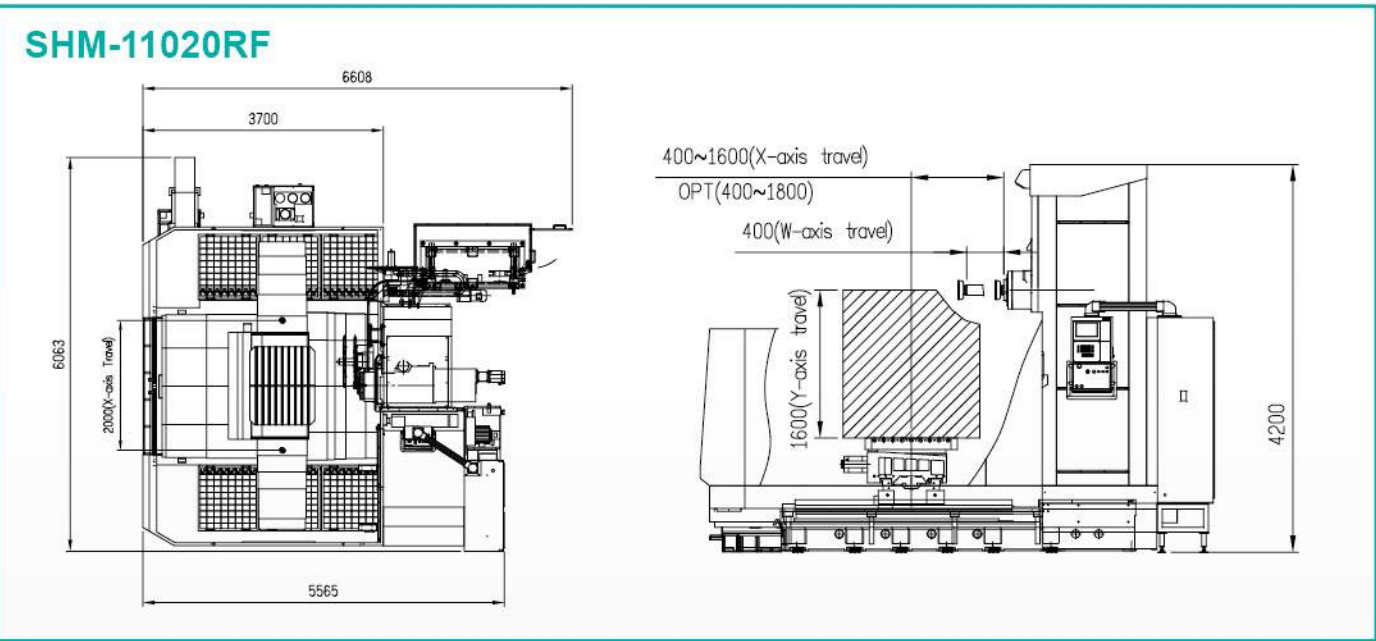


Item	Test description	Tolerance	Actual
1	Milling roundness D5	0.02/ALL	0.0055
2	Cylindricity D6	0.02/ALL	0.0056
3	Perpendicularity of C1C2 and C2C3	0.02/ALL	0.0026
4	Parallelism of C1C2 and C3C4	0.02/ALL	0.0056
5	Distance between B1B2 and center	0.02/ALL	0.0014
6	Perpendicularity of B1B2 and B2B3	0.02/ALL	0.0037
7	Parallelism of B1B2 and B3B4	0.02/ALL	0.0041

Heavy cutting report (Spindle motors 15/18.5kW)

Cutting material	S45C	Tool diameter	125	Number of teeth	10	Spindle type	Gear	Z travel	1,700
Cutting speed	Linear Velocity of Tool	Feed per tooth	Cutting depth	Cutting width	Feed rate	Travel direction	Z axis position	c.c./min Removing rate	Feedrate overload
375	147.3	0.53	3	110	2,000	X-	-1,500	660	16%
375	147.3	0.53	3	110	2,000	X+	-1,500	660	14%
375	147.3	0.29	5	110	1,100	X-	-1,505	605	18%
375	147.3	0.29	5	110	1,100	X+	-1,505	605	15%

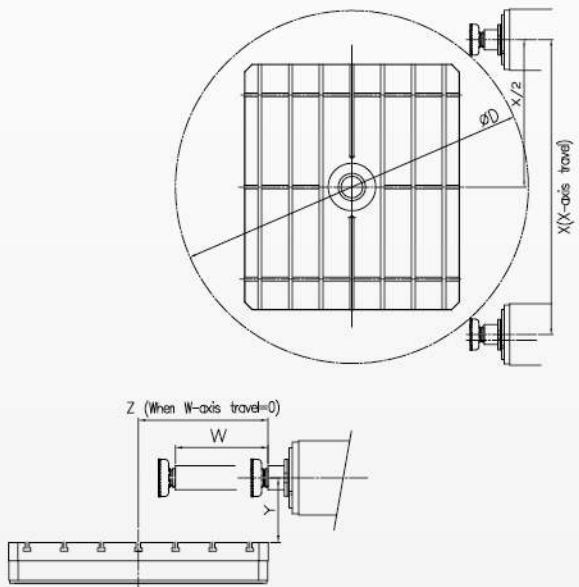
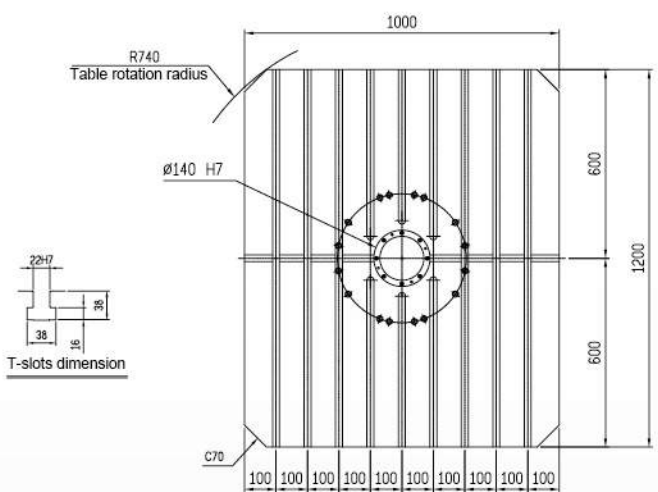
Machine Layout



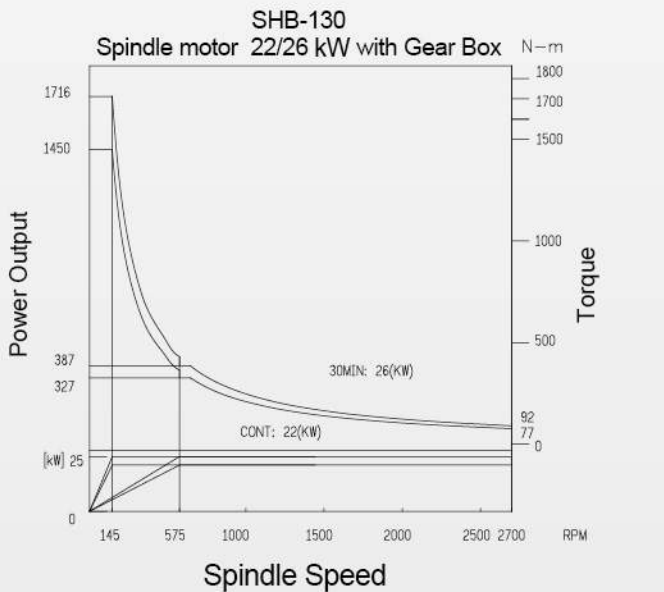
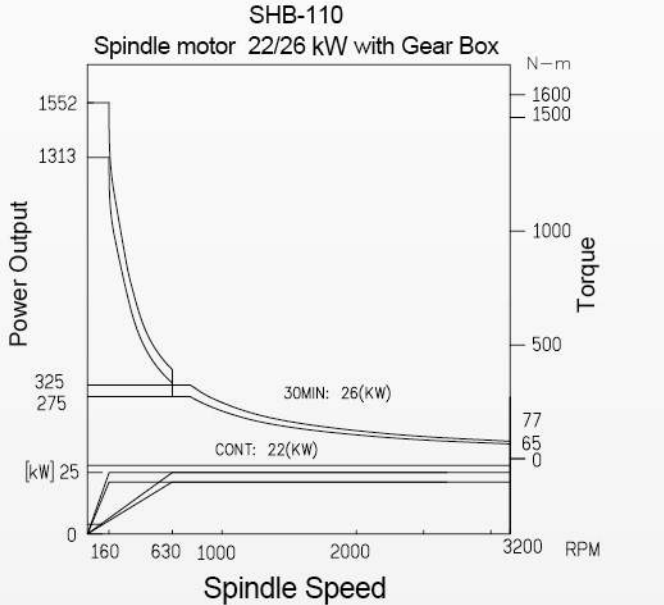
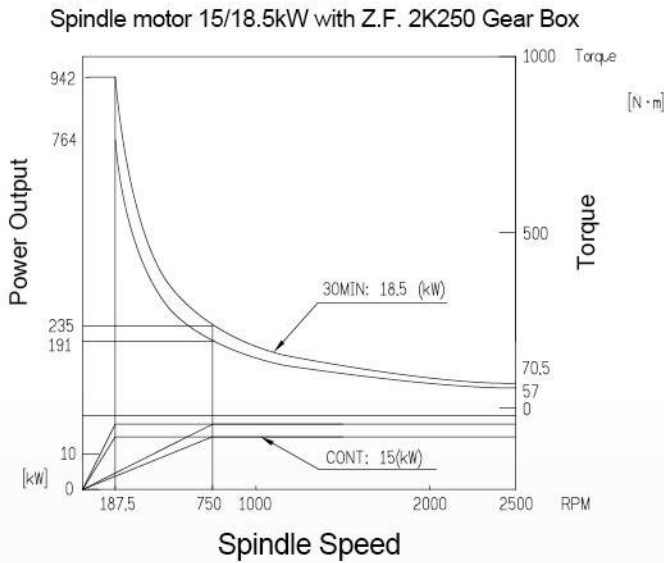
SHB-Model	X-axis travel	Table Size	W-axis travel=0		Distance from table top to spindle center	Max. workpiece rotating diameter	W-axis travel			
	X		Z=1,500	Z=1,700	Y-axis travel	WD	WS			
11025RS	2,500	1,600X1,400	500~2,000	500~2,200	1,800 (opt:2,000/2,300/2,500)	Ø 2300	500(700)			
11030RS	3,000					2,000X1,800	785~2,285	785~2,485	Ø 2,600	700
11040RS	4,000								1,600X1,400	585~2,085
11030RM	3,000	2,000X1,800	785~2,285	785~2,485		Ø 2,600				
11040RM	4,000					3,200X1,800			Ø 2,600	
13025RS	2,500	1,600X1,400	585~2,085	585~2,285					Ø 2,300	
13030RS	3,000					2,000X1,800	785~2,285	785~2,485	Ø 2,600	
13040RS	4,000	3,200X1,800							Ø 2,600	
13030RM	3,000					3,200X1,800			Ø 2,600	
13040RM	4,000								Ø 2,600	
13030RL	3,000								Ø 2,600	
13040RL	4,000									

SHB-Model	Length	Height	Width	
		Y=1,800(OPT:2,000/2,300/2,500)	Z=1,500	Z=1,700
11025RS	7,184	4,125(OPT:4,325/4,625/4,825)	6,526	6,726
11030RS	7,734			
11040RS	8,834			
11030RM	7,940	4,340(OPT:4,540/4,840/5,040)	6,834	6,834
11040RM	9,040			
13025RS	7,184	4,125(OPT:4,325/4,625/4,825)	6,475	6,522
13030RS	7,734			
13040RS	8,834			
13030RM	7,940	4,340(OPT:4,540/4,840/5,040)	6,682	6,882
13040RM	9,040			
13030RL	9,040			
13040RL	10,140			

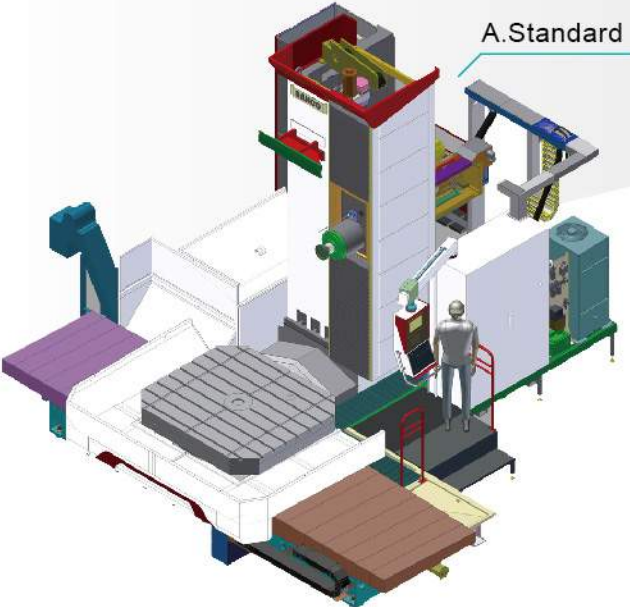
Table Size



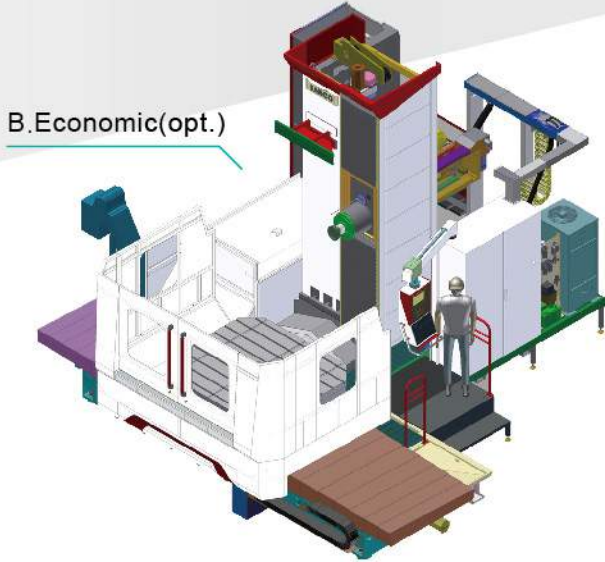
Spindle Power Output Diagram



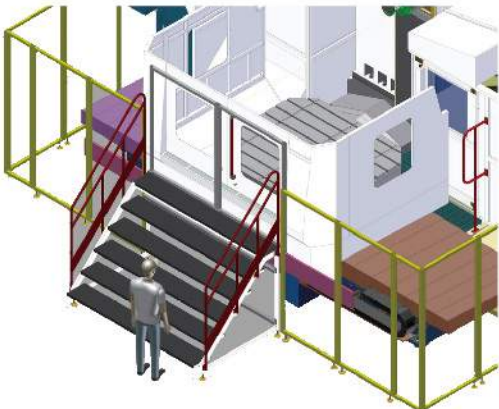
Splash Guardov



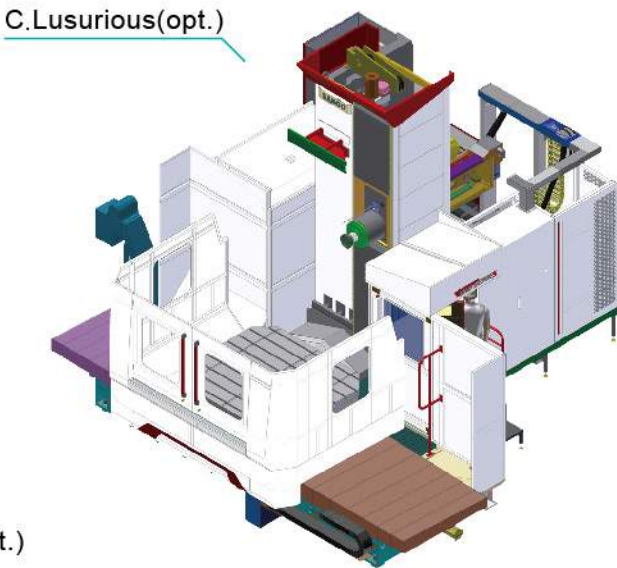
A. Standard



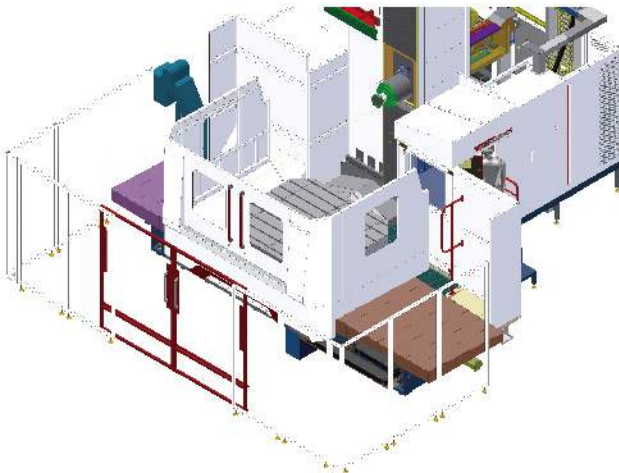
B. Economic(opt.)



- Maintenance Ladder(opt.)



C. Luxurious(opt.)



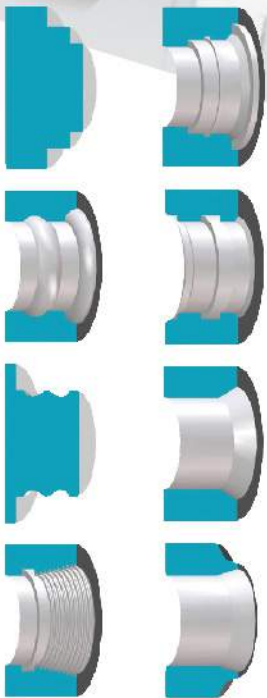
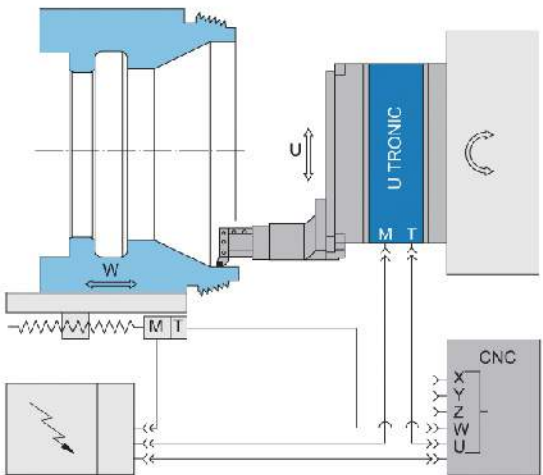
D. CE(opt.)

Splash Guard & Cover List				
	A. Standard	B. Economic	C. Luxurious	D. CE
Applicable Cutting Patterns	Dry	Dry/Wet	Dry/Wet	Dry/Wet
CE	X	X	○	●
Track-type Operation Box	○	○	○	○
Chip Tray Table Bbelow (not expandable)	●	X	X	X
Chip Tray Table Below	X	●	●	●
Splash Guard Around Table	X	●	●	●
X-axis Dual Automatic Chip	X	X	X	X
X-axis Rear of the Automatic Chip	●	●	●	●
Z-axis Side of the Automatic Chip	●	●	●	●
Standard Operational Area(dry cutting only)	●	X	X	X
Waterproof Operational area	X	●	X	X
Waterproof and Splash Proof Operational Area	X	X	●	●
Fully Closed Splash Guard Operation Area	X	X	X	X
Chain Type Chip Conveyor	●	●	●	●
Water Tank	●	●	●	●

●:STANDARD ○:OPTIONAL X:NOT AVAILABLE

Optional Accessory

- Opt. U axis (facing head)
U axis feature:
U-axis (servo control) travel: 200mm
- 1.The maximum machining diameter 1250mm
(with Specify Tools)
 - 2.The max. speed : 250rpm
 - 3.Toolholder shank end face double contact for high precision heavy cutting force



Optional Accessories



Square Block
600x600x900mm



Square Block
800x500x800mm



90° Milling
Head



Manual Univetsal
Milling Head



Spindle Extension
Sleeve

Movable Column Type Horizontal Boring Machine-long Table

Long table

Rotary table size :

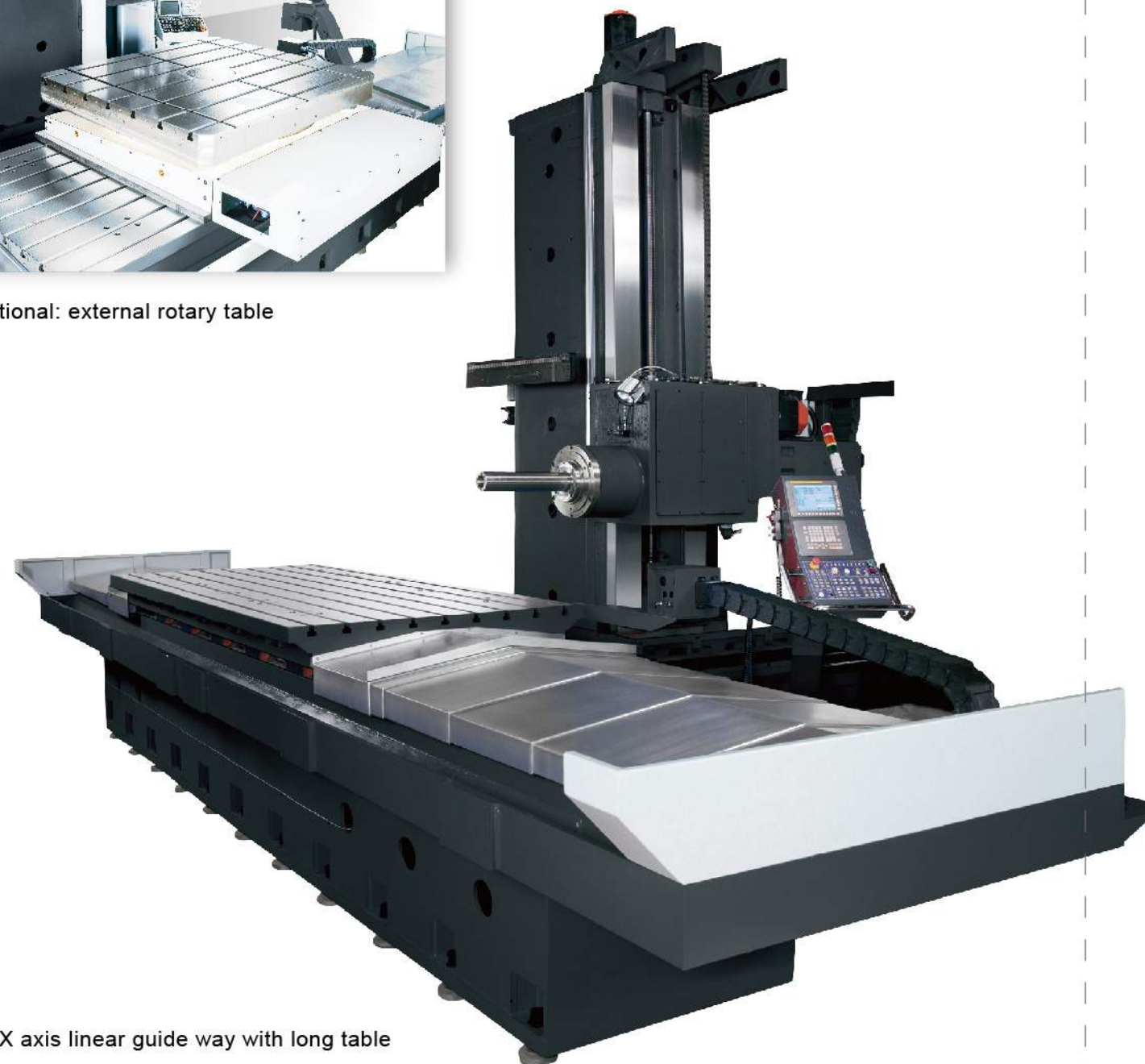
1.2000x1400(mm) , X axis travel 2000mm

2.3000x1400(mm) , X axis travel 3000mm

3.4000x1400(mm) , X axis travel 4000mm



■ Optional: external rotary table



Remark: X axis linear guide way with long table

SPECIFICATIONS		SHB-11020S	SHB-11030S	SHB-11040S	SHB-13030S	SHB-13040S
TABLE						
Overall size	mm	2,000x1,400	3,000x1,400	4,000x1,400	3,000x1,400	4,000x1,400
Maximum load	ton	8	10	12	10	12
T-Slots	mm	Long table (T-slot 22X9)				
Height from ground	mm	1,228				
TRAVEL						
X axis travel	mm	2,000	3,000	4,000	3,000	4,000
Y axis travel	mm	1,800 (2,000/2,300/2,500)				
Z axis travel	mm	1,500 (1,700)				
W axis travel	mm	500(700)			700(900)	
Distance from table center to spindle nose	mm	500~2,000 (2,200)				
Distance from table top to spindle center	mm	15~1,800(2,015/2,315/2,515)				
SPINDLE						
W spindle diameter	mm	110			130	
Spindle speeds	rpm	3,200			2,700	
Taper	mm	TAPER 7/24				
FEED RATE						
X/Y/Z/W rapid feedrate	m/min	10 / 10 / 10 / 5	10 / 10 / 10 / 5		10 / 10 / 10 / 5	
Cutting feedrate	mm/min	1~5,000	1~5,000		1~5,000	
Motor						
Spindle (30min. / cont.)	kW	22/26 (30/37)				
X/Y/Z/W/B axis feed motor	kW	7/7/7/3/7	7/7/7/3/7		7/7/7/3/7	
ATC						
No. of tools	tools	40(60)				
Taper	-	BT-50				
Pull stud.	-	MAS403-P50T-1				
Tool selection	-	fixed type				
Diameter of Max. tool (with adjacent tools)	mm	Ø125				
Diameter of Max. tool (without adjacent tools)	mm	Ø245				
Max tool weight	kg	35				
Max tool length	mm	400				
MISCELLANEOUS						
Power supply	kVA	45	45	45	70	70
Hydraulic oil tank	L	110	110	110	110	110
Coolant tank	L	500	500	500	500	500
Lubricant tank	L	8	8	8	8	8
Machine weight (approx.)	kg	34,0000	38,000	40,000	39,000	41,000
CNC control	-	FANUC/ MITSUBISH/ SIEMENS/ HEIDENHAIN				
FLOOR SPACE						
Machine heigh	mm	4,125(4,325/4,625/4,825)				
Machine length	mm	60,500	80,500	10,500	80,500	15,500
Machine width	mm	6,526(6,726)			6,676(6,876)	

*Specifications are subject to change without notice.

Machine Specifications

SPECIFICATIONS		SHM-11020RF	SHB-110XXR					SHB-130XXR						
MODEL	UNIT	SHM-11020RF	SHB-11025RS	SHB-11030RS	SHB-11040RS	SHB-11030RM	SHB-11040RM	SHB-13025RS	SHB-13030RS	SHB-13040RS	SHB-13030RM	SHB-13040RM	SHB-13030RL	SHB-13040RL
TABLE														
Overall size	mm	1,000x1,200	1,400x1,600 (1,600x1,800)			1,800x2,000		1,400x1,600 (1,600x1,800)			1,800x2,000		3,200x1,800	
Maximum load	ton	5	7(10)			15(20)		7(10)			15(20)			
T-Slots	mm	22x9	24x7			28x9		24x7			28x9			
Height from ground	mm	1,236	1,228			1,440		1,228			1,440			
B-Axis min. increment	°	0.001°	0.001°、±5"					0.001°、±5"						
TRAVEL														
X axis travel	mm	2,000	2,500	3,000	4,000	3,000	4,000	2,500	3,000	4,000	3,000	4,000	3,000	4,000
Y axis travel *1	mm	1,600	1,800 (2,000/2,300/2,500)					1,800 (2,000 / 2,300 / 2,500)						
Z axis travel	mm	1,200(1,400)	1,500 (1,700)					1,500 (1,700)						
W axis travel	mm	400	500 (700)			700		700(900)						
Distance from table center to spindle nose	mm	400~1,600	500~2,000 (2,200)			785~2,285 (2,485)		585~2,085 (2,285)			785~2,285 (2,485)			
SPINDLE														
W spindle diameter	mm	110	110					130						
Spindle speeds	rpm	5~2,500	3,200(2,500)(without W axis : 6,000)					2,700(2,000)(without W axis : 6,000)						
Taper	mm	TAPER 7/24	TAPER 7/24					TAPER 7/24						
FEED RATE														
X/Y/Z/W rapid feedrate	m/min	10 / 10 / 10 / 5	10 / 12 / 12 / 5					10 / 12 / 12 / 5						
Cutting feedrate	mm/min	1~5,000					1~5,000							
Motor														
Spindle (30min. / cont.)	kW	15 / 18.5 (22 / 26)	22 / 26 (30 / 37)					22 / 26 (30 / 37)						
X/Y/Z/W/B axis feed motor	kW	7 / 7 / 7 / 3 / 7	7 / 7 / 9 / 3 / 7			9 / 7 / 9 / 3 / 7		7 / 7 / 9 / 3 / 7			9 / 7 / 9 / 3 / 7			
ATC														
No. of tools	tools	40(60)	40(60)					40(60)						
Taper	-	BT-50	BT50(CAT50/DIN50)					BT50(CAT50/DIN50)						
Pull stud.	-	MAS403-P50T-1	MAS403-P50T-1(CAT50/DIN50)					MAS403-P50T-1(CAT50/DIN50)						
Tool selection	-	fixed type	fixed type					fixed type						
"Diameter of Max. tool (with adjacent tools)"	mm	φ 125	φ 125					φ 125						
"Diameter of Max. tool (without adjacent tools)"	mm	φ 245	φ 245					φ 245						
Max tool weight	kg	35	35					35						
Max tool length	mm	400	400					400						
MISCELLANEOUS														
Power supply	kVA	60	60			70		60			70			
Hydraulic oil tank	L	70	110					110						
Coolant tank	L	520	500					500						
Lubricant tank	L	8	8					8						
Machine weight (approx.)	kg	21,000	32,000	33,000	34,000	33,000	34,000	40,000	42,000	46,000	42,000	46,000	47,000	51,000
CNC tontrol	-	FANUC/ MITSUBISH/ SIEMENS/ HEIDENHAIN						FANUC/ MITSUBISH/ SIEMENS/ HEIDENHAIN						
FLOOR SPACE														
Machine heigh	mm	4,200	4,125(4,325/4,625/4,825)			4,340(4,540/4,840/5,040)		4,125 (4,325/4,625/4,825)			4,238 (4,538/4,838/5,038)			
Machine length	mm	6,063	7,184	7,734	8,834	7,490	9,040	7,184	7,734	8,834	7,490	9,040	9,040	10,140
Machine width	mm	6,608	6,526 (6,726)			6,834 (6,834)		6,475 (6,522)			6,682 (6,882)			

*SHB-130xxRS & SHB-110xxRS - If the rotary table with simultaneously function, the Y-axis travel will reduce 40mm.

*Specifications are subject to change without notice.

Standard Accessories

- SPINDLE AIR BLAST SYSTEM
- PROGRAMMABLE COOLANT SYSTEM
- AUTOMATIC LUBRICATION SYSTEM
- HYDRAULIC SYSTEM
- M.P.G.
- HEAT EXCHANGER IN CABINET
- AUTOMATIC POWER OFF
- WORKING LAMP & ALARM LAMP
- SCREW AUGER & CHAIN TYPE CHIP CONVEYORS & CART
- MACHINE & CONTROLLER MANUALS
- LEVELLING BOLTS & PADS
- TOOLS BOX FOR MACHINE ADJUSTMENT
- RS-232C & RJ-45 TERMINAL INTERFACE
- AICC II (200 Block / 30m)
- X/Y/Z AXES LINEAR SCALES

Optional Accessories

- AUXILIARY WORK TABLE
- AIR CONDITIONER AT CABINET
- SPINDLE EXTENSION SLEEVE 300/500mm
- 90° MILLING HEAD
- FACING HEAD
- MANUAL UNIVERSAL MILLING HEAD
- ATC WITH 60, 90
- SPLASH GUARD
- ECONOMIC TYPE(SPLASH GUARD AROUND TABLE)
- LUXURIOUS TYPE(SPLASH GUARD AROUND TABLE+PROTECTING DOOR FOR OPERATOR+EXTENDED COVER ON ATC)
- CE TYPE(SPLASH GUARD AROUND TABLE+PROTECTING DOOR FOR OPERATOR+EXTENDED COVER ON ATC+PROTECTING FENCE IN FRONT OF MACHINE)